

Access LCTA

A Database Interface for Managing LCTA Data



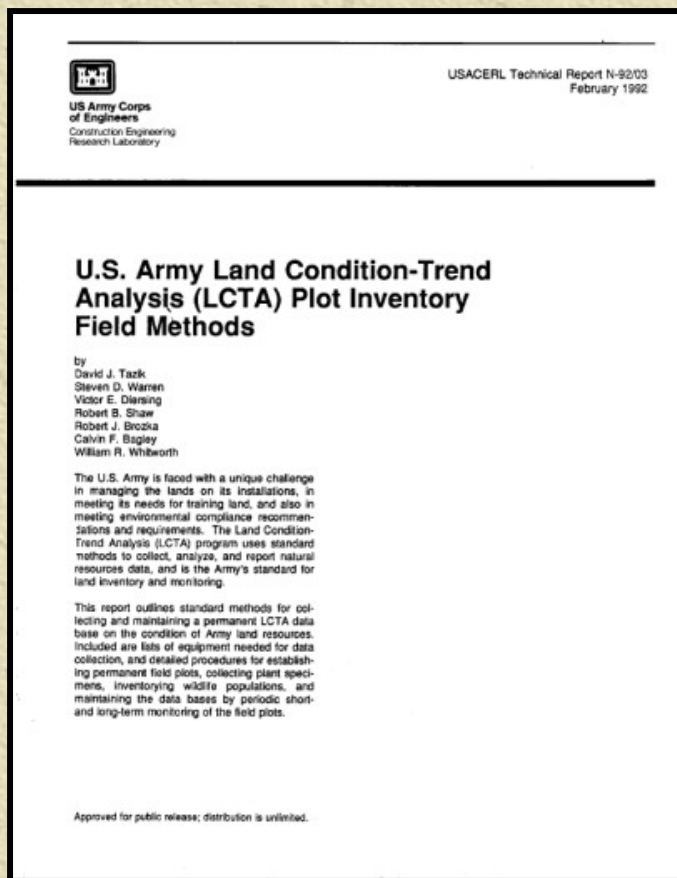
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Center for Environmental Management of Military Lands (CEMML)
Colorado State University
Fort Collins, CO



LCTA

- Land managers collect, store, retrieve, and analyze data related to
 - ◆ topographic features
 - ◆ soil characteristics
 - ◆ climatic variables
 - ◆ vegetation
 - ◆ wildlife
 - This can equate to a large amount of data collected, which in turn must be stored
 - LCTA database schema developed
-

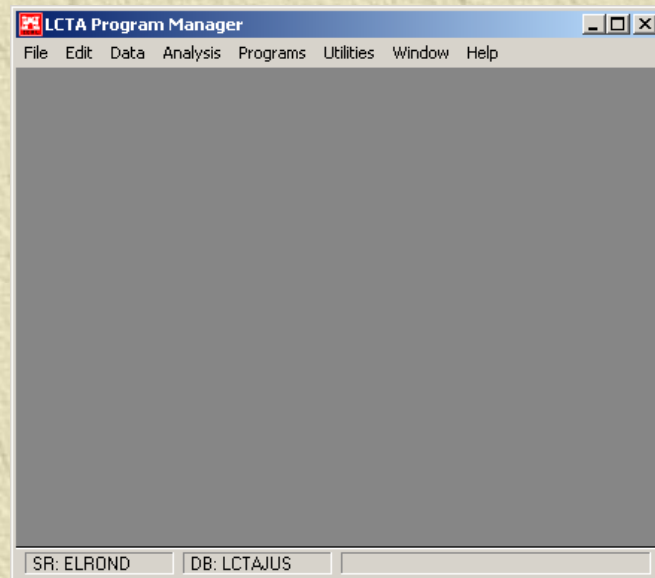
LCTA Database Interfaces



- Developed based on LCTA data collection consistent with the original protocol
- *U.S. Army Land Condition-Trend Analysis (LCTA) Plot Inventory Field Methods.*
 - ◆ TR N-92/03/ ADA247931. USACERL
 - ◆ Tazik, D.J., Warren, S.D., Diersing, V.E., Shaw, R.B., Brozka, R.J., Bagley, C.F., and Whitworth, W.R. (1992).

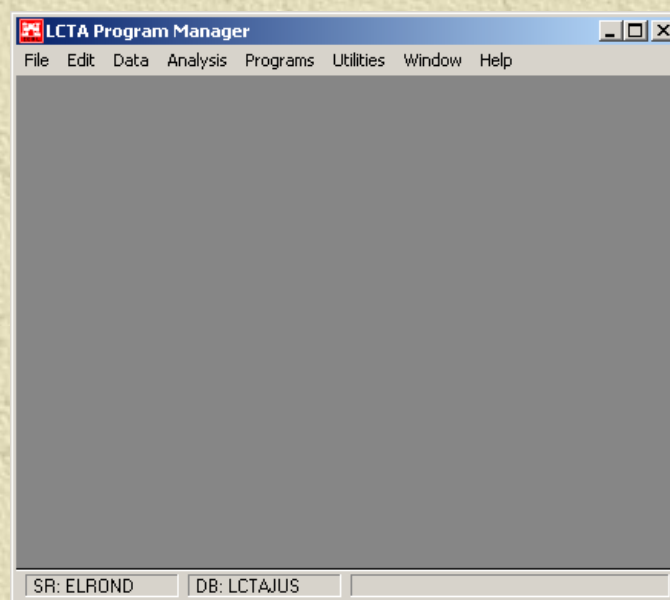
LCTA Database Interfaces

- LCTA Program Manager
 - ◆ U.S. Army Construction Engineering Research Laboratories (CERL) in Champaign, IL.
- Access LCTA
 - ◆ Center for Environmental Management of Military Lands (CEMML) in Fort Collins, CO



LCTA User Interface History

- December 1991
 - ♦ Beta Version of the LCTA Program Manager
 - ♦ DOS character-based program
- Helped to establish software design specifications for Version 1.1



LCTA Program Manager

- Graphical User Interface (GUI)
 - ♦ ease of use
 - ♦ reduced training requirements
 - Standardized analysis
 - ♦ ensures proper error checking.
 - ♦ report of errors found in the data during processing provides increased data integrity
 - By minimizing complex operations of data management and analysis, the land manager has more time to interpret the results
-

Microsoft Access

- Since the development of the LCTA Program Manager, many new database tools have become available
 - Some of these new tools are packaged with complete office software solutions
 - Microsoft Access has risen to the forefront of popularity in the database arena
 - Expressed interest by installations
-

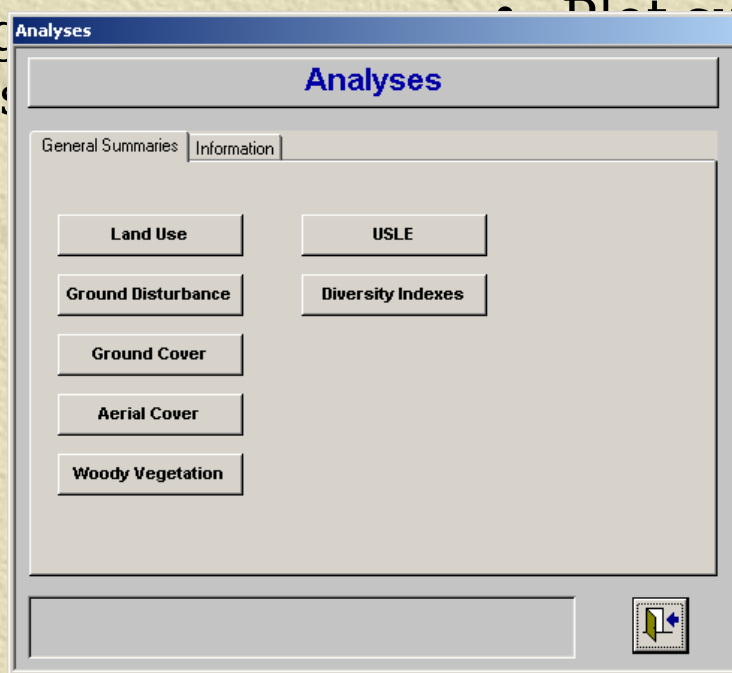
Access LCTA

- Written in Microsoft VBA
- LCTA database schema migrated to the Access database



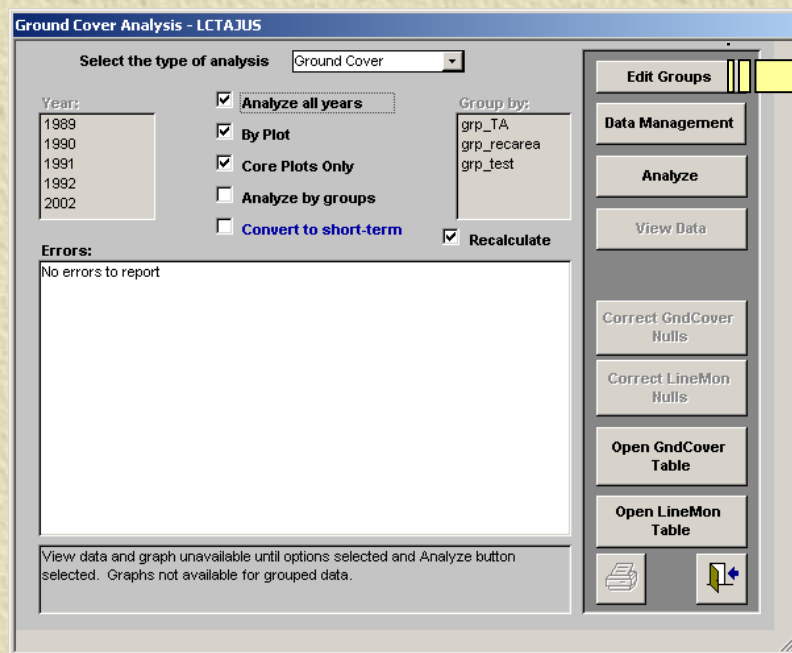
Access LCTA Analyses - General Summaries

- Land use summaries
- Ground disturbance summaries
- Ground cover summaries
- Aerial cover summaries
- Woody vegetation summaries
- Universal Soil Loss Equation (USLE) calculations
- Diversity indexes
- Power analysis
- Plot summaries

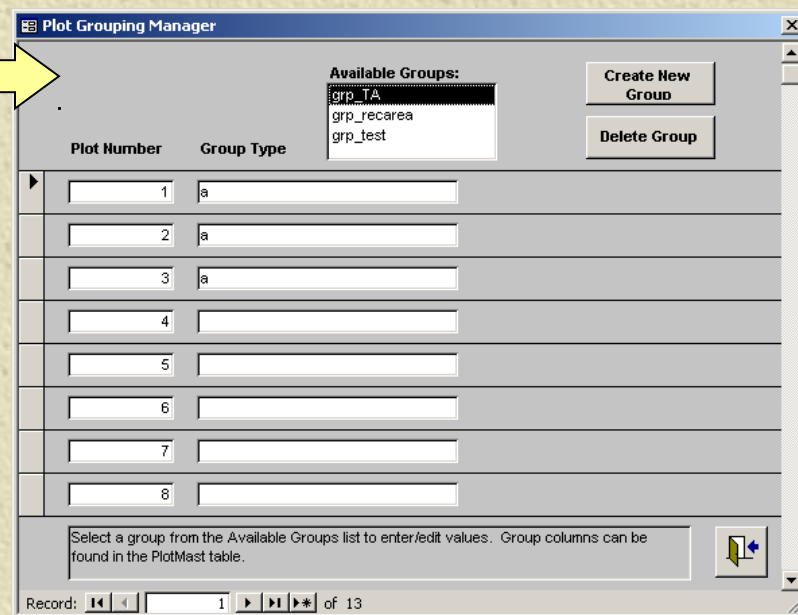


Access LCTA Analyses - General Summaries

- Most can be analyzed in a variety of ways
 - ♦ all years together
 - ♦ or one specific year
 - ♦ include/exclude special use plots
 - ♦ summarize by a user defined grouping variable



The screenshot shows the 'Ground Cover Analysis - LCTAJUS' window. It features a 'Select the type of analysis' dropdown set to 'Ground Cover'. Below this, there's a 'Years' list with 1989, 1990, 1991, 1992, and 2002. A 'Group by:' section lists 'grp_TA', 'grp_recarea', and 'grp_test'. Checkboxes for 'Analyze all years', 'By Plot', 'Core Plots Only', 'Analyze by groups', and 'Convert to short-term' are visible, along with a 'Recalculate' checkbox. An 'Errors:' section at the bottom left states 'No errors to report'. A vertical toolbar on the right contains buttons for 'Edit Groups', 'Data Management', 'Analyze', 'View Data', 'Correct GndCover Nulls', 'Correct LineMon Nulls', 'Open GndCover Table', and 'Open LineMon Table'. A yellow arrow points from the 'Edit Groups' button to the 'Plot Grouping Manager' window.



The screenshot shows the 'Plot Grouping Manager' window. It has an 'Available Groups:' list with 'grp_TA', 'grp_recarea', and 'grp_test'. Buttons for 'Create New Group' and 'Delete Group' are present. A table with columns 'Plot Number' and 'Group Type' contains 8 rows. The first three rows have 'a' in the 'Group Type' column, while the last five are empty. A text box at the bottom explains: 'Select a group from the Available Groups list to enter/edit values. Group columns can be found in the PlotMast table.' The status bar at the bottom indicates 'Record: 1 of 13'.

Plot Number	Group Type
1	a
2	a
3	a
4	
5	
6	
7	
8	

Access LCTA Analyses - General Summaries

- All errors found during the analysis process are reported
- Errors can be easily corrected by navigating management modules

Ground Cover Analysis - LCTAJUS

Select the type of analysis: Ground Cover

Years: 1989, 1990, 1991, 1992, 2002

☒ Analyze all years
☒ By Plot
☒ Core Plots Only
☐ Analyze by groups
☐ Convert to short-term
☐ Recalculate

Group by: grp_TA, grp_recarea, grp_test

Errors:

Plot: 3, Date: 7/18/1989 is missing from GndCover data.
Plot: 6, Date: 7/20/1989 is missing from GndCover data.
Plot: 8, Date: 7/20/1989 is missing from GndCover data.
Plot: 9, Date: 7/20/1989 is missing from GndCover data.
Plot: 1, Date: 7/3/1990 has null GndCov data in LineMon.
Plot: 11, Date: 6/27/1990 has null GndCov data in LineMon.
Plot: 100, Date: 7/3/2002 has null GndCov data in LineMon.
Finished Analyzing

View data and graph unavailable until options selected and Analyze button selected. Graphs not available for grouped data.

Data - LCTAJUS

PlotID	RecDate	VegLoc	Disturb	GndCov	AerCov
1	7/3/1990	60.5			
1	7/3/1990	71.5			
1	7/3/1990	70.5			
1	7/3/1990	69.5			
1	7/3/1990	68.5			
1	7/3/1990	67.5			
1	7/3/1990	66.5			
1	7/3/1990	65.5			
1	7/3/1990	64.5			
1	7/3/1990	63.5			
1	7/3/1990	99.5			

LineMon data as needed

Access LCTA Analyses - General Summaries

- Results are displayed with options for
 - ♦ printing
 - ♦ graphing
 - ♦ exporting
 - ♦ filtering
 - ♦ displaying results in a matrix view

Ground Cover Summary - LCTAJUS

	Year	PlotID	Cover	Percent of Plot
▶	1989	1	BG	8
	1989	1	BRIN2	2
	1989	1	CREEK	0
	1989	1	DT	0
	1989	1	DW	0
	1989	1	ELV13	0

Pivot Data Export Data

Graphing Printing Filtering Matrix View

Access LCTA Analyses - General Summaries

- Results are displayed with options for
 - ◆ printing

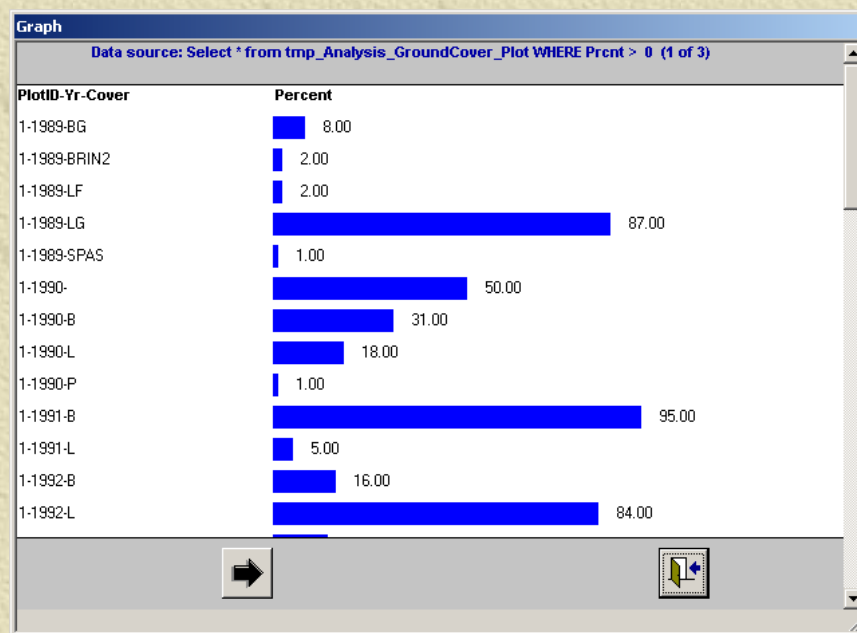
Fort Justright Ground Cover Summary

Year(s): All
Plot Type: Core plots only
Group Variable: Plots

Year	Plot	Use	Percent of Plots
1989	1	BG	8.00
1989	1	BRIN2	2.00
1989	1	CREEK	0.00
1989	1	DT	0.00
1989	1	DW	0.00
1989	1	ELM3	0.00
1989	1	ERSP	0.00
1989	1	L	0.00
1989	1	LF	2.00
1989	1	LG	87.00
1989	1	LT	0.00
1989	1	MOSS	0.00
1989	1	SCSC	0.00

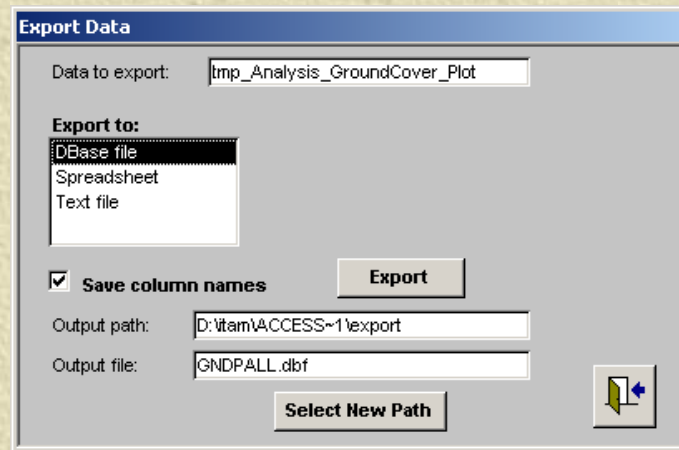
Access LCTA Analyses - General Summaries

- Results are displayed with options for
 - ◆ graphing



Access LCTA Analyses - General Summaries

- Results are displayed with options for
 - ♦ exporting



Access LCTA Analyses - General Summaries

- Results are displayed with options for
 - ♦ filtering

The following data set will be filtered: tmp_Analysis_GroundCover_Plot

Column	Operator	Value	
▶ Prent	>	0	☐ And ☐ Or ☒ None
Delete			
*			☐ And ☐ Or ☒ None
Delete			



When entering text into the value field be sure to surround it with double quotes. Do not use quotes with number values. If using the In operator be sure to place a comma between values and enclose all values in parenthesis.

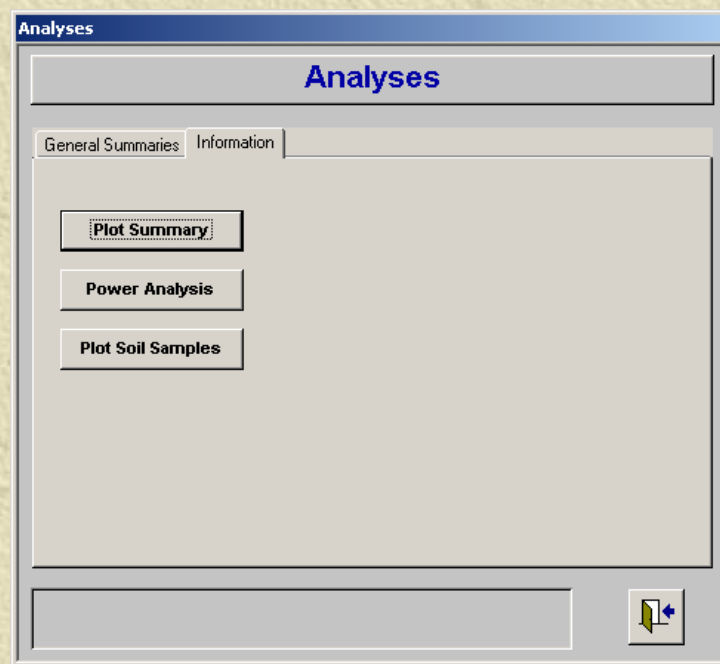
Access LCTA Analyses - General Summaries

- Results are displayed with options for
 - ♦ displaying results in a matrix view

PlotID	Cover	1989	1990	1991	1992	2002
2 L		0	100	100	99	
2 LF		0	0			
2 LG		2	0	0		
2 LT		75	0	0		
2 M					0	
2 MOSS		1	0			
2 P			0	0	1	
2 R				0	0	
2 RO			0	0		
2 SCSC		0				
2 SONU2		0				
2 SPAS		0				
2 TR				0		

Access LCTA Analyses - Information

- Plot summary
- Power analysis
- Plot soil samples



Plot Summary

LCTA Plot Summary						
Plot: 1		Recording Date: 7/21/1989				
Plot: 1 Initial Recording Date: 21-Jul-89						
Easting: 926		Azimuth: 330		Soil Series: Mu		
Northing: 239		Declination:		R Value: 200		
USGS Quad JUNCTION CITY						
Soil Series Information						
Soil Name: unknown						
Published K Value:						
Soil Loss Tolerance:						
Calculated K Value: -1.00						
Calculated K Value StdDev: -1.00						
Recording Date: 21-Jul-89						
Inventory Type: I		Surveyor: KEITH MCNICKLE		Vegetation Type: GRASSLAND		
Plot Type: C		Recorder: PAUL DUBOIS		Aspect: E		
		Training Area: 1		Soil Depth: >4		
Notes:						
Slope Information						
Location	Slope	Length				
0	7.50	31.00				
50	7.50	24.00				
100	10.50	6.00				
Observed Military / Nonmilitary Land Use						
Foot						
No Non-Mil:						
Tracked						
Wheeled						
Observed Maintenance Activities						
Mowing						
Observed Erosion Evidence						
No Water Erosion						
No Wind Erosion						
Aerial Cover Species						
VegetID	Num	Family	Genus	Species	Subspecies	Variety
BRIN2	52	GRAMINEAE	BROMUS	INERMIS	-	-
CARE	1	CYPERACEAE	CAREX	-	-	-

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- Location
- Soil series information
- Slope data
- Land use, maintenance activities, observed erosion
- Known/unknown species
 - ♦ aerial cover
 - ♦ ground cover
 - ♦ belt transect



Diversity Indexes

- Summarizes presence/absence aerial vegetation data
 - Five diversity metrics
 - ♦ Margalef's index
 - ♦ Berger-Parker index
 - ♦ Simpson's index
 - ♦ Shannon index
 - ♦ Shannon evenness
 - Calculates an average diversity index grouped by a user-defined grouping element
 - For each group the diversity index values are given for 15 guilds
 - ♦ grass introduced, grass native, forb introduced,.....
-

Power Analysis

- Power analysis is a statistical technique in quantifying the ability of a monitoring program to detect change in the monitored resource
 - Type-I error (α)
 - ♦ probability of rejecting the null hypothesis when the null hypothesis is true
 - Type-II error (β)
 - ♦ probability of failing to reject the null hypothesis when the null hypothesis is false
 - Statistical power ($1 - \beta$)
 - ♦ probability that a particular test will reject the null hypothesis at a particular level (α) when the null hypothesis is false.
-

Power Analysis

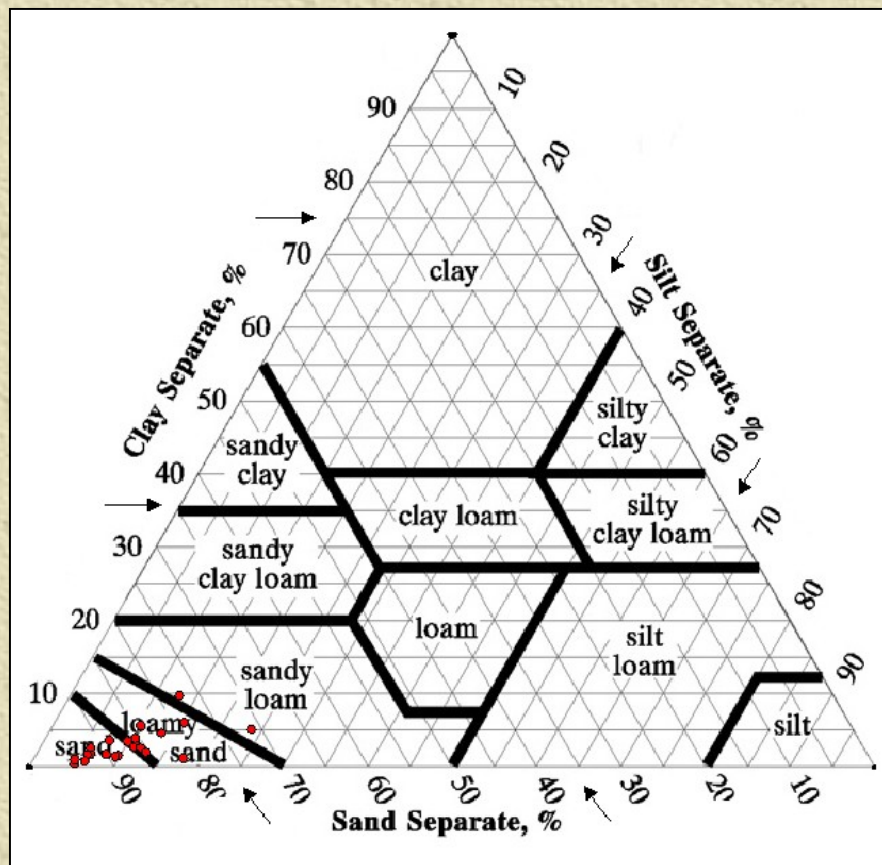
- Access LCTA uses paired plot comparisons (t-test) between two years

The screenshot shows the 'Power Analysis' software window. It features several input fields and dropdown menus for configuring a statistical test. The 'First Year' dropdown is set to 1989, and the 'Second Year' field is empty. The 'Variable to Test' dropdown lists 'Own Data', 'Disturbance', 'Bare Ground', 'Canopy Cover', and 'Annual Cover'. The 'Type of Test (alpha)' section has two radio buttons: 'One tailed t test' and 'Two tailed t test', with the latter being selected. The 'Plots/Year' and 'Plots in Common (n)' fields are empty. The 'Estimate Sample Size' button is visible. Below these, the 'Degrees of Freedom' field is empty, and the 'Variance of the difference' field is also empty. The 'Type-I error level (alpha)' and 'Type-II error level (beta)' are both set to 0.1. The 'Power (1-beta)' is set to 0.9. The 'Student t critical value for alpha' and 'Student t critical value for beta' fields are empty. The 'Minimum Detectable Effect Sizes (MDES)' section has two sub-sections: 'Absolute MDES' and 'Relative MDES', both with empty input fields. At the bottom, there is a text box with the instruction 'Select the first and second years, variable to inspect, and the alpha and beta levels.' and a small icon of a document with a plus sign.

Power Analysis

First Year: 1989
Second Year:
Variable to Test: Own Data
Disturbance
Bare Ground
Canopy Cover
Annual Cover
Enter Your Own Data
Type of Test (alpha)
☐ One tailed t test
☒ Two tailed t test
Plots/Year:
Plots in Common (n):
Estimate Sample Size
Degrees of Freedom:
Variance of the difference:
Type-I error level (alpha): 0.1
Student t critical value for alpha:
Type-II error level (beta): 0.1
Student t critical value for beta:
Power (1-beta): 0.9
(Beta critical value based on one-tailed t-test)
Minimum Detectable Effect Sizes (MDES)
Absolute MDES:
Relative MDES:
Select the first and second years, variable to inspect, and the alpha and beta levels.

Plot Soil Samples



Fort Justright
Soil Sample Data

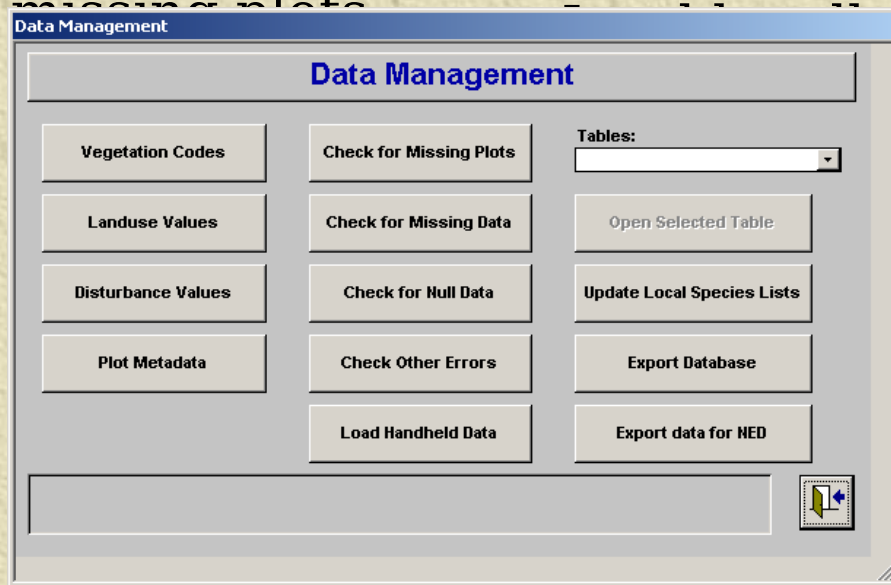
Soil Series	Group	% Sand	% Silt	% Clay
Ha		83.80	10.40	5.80
Ha		91.70	6.40	1.90
Ha		86.40	9.90	3.70
Ha		85.70	11.00	3.30
ST		92.10	6.10	1.80
ST		88.50	7.70	3.80
Ge		78.50	15.30	6.20
Ge		81.90	13.30	4.80
Sm		91.20	6.00	2.80
Sm		77.20	12.90	9.90
SN		89.80	8.30	1.90
SN		86.10	11.00	2.90
Rd		94.20	5.20	0.60
Rd		85.30	10.60	4.10
Ad		88.50	9.80	1.70
Ad		93.90	4.90	1.20
TU		92.80	6.20	1.00
TU		88.90	9.50	1.60

Access LCTA Data Management

- An essential part of using the LCTA data is data management
- Access LCTA includes a data management module
- This module assists the user in finding and correcting missing or invalid data

Access LCTA Data Management

- VegID correction
- Land use value correction
- Ground disturbance value correction
- LCTA plot metadata
- Check for missing plots
- Check for missing data
- Check for null values
- Open tables
- Update local species lists
- Database export
- Load handheld data files



Access LCTA Data Management

- Correct vegetation codes

Unknown VegID Management - LCTAJUS

Unknown values from **AerCover**

Unknown VegID:

PAQA5
TL
uaf
UNK1
UNK2
upf
water

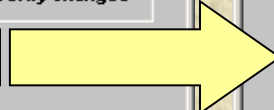
Change to:

☒ **Verify changes**

Number of unknowns:

Note: Some codes, such as BG, LT, LS, LG, LF, etc. are acceptable codes.

This form will allow you to make global changes for vegetation codes for the table listed above.



Data Management - Vegetation Code Summary

Criteria

Table: **AerCover**

Plots: **10**

Dates: **6/29/1989**

Unknown VegID:

Change to:

☒ **Verify changes**

Select the criteria above and enter a new value to change the unknown VegID

Access LCTA Data Management

- Find missing plots / d

Data Management - Missing Plots

☒ Missing LandUse plots
☒ Missing MaintAct plots
☒ Missing ErosEvid plots
☒ Missing GndCover plots
☒ Missing AerCover plots
☐ Missing LineMon plots
☒ Missing BeltTran plots
☐ Missing BeltMon plots
☒ Missing BeltSurv entries

Select the Check Database button to check for the error categories listed to the left. All errors found will be written below and the category list will contain a check mark.

To print the errors select the printer button below.

Check Database 

Plot: 7, Date: 7/25/1990 is missing from Landuse data.
Plot: 100, Date: 7/3/2002 is missing from Landuse data.
Plot: 7, Date: 7/25/1990 is missing from Maintact data.
Plot: 100, Date: 7/3/2002 is missing from Maintact data.
Plot: 7, Date: 7/25/1990 is missing from Erosevid data.
Plot: 100, Date: 7/3/2002 is missing from Erosevid data.
Plot: 3, Date: 7/18/1989 is missing from GndCover data.

Missing Slope Data - LCTAJUS

Instalid	PlotID	RecDate	Location	Slope	Length
JUS	11	6/23/1989	50		
JUS	11	6/23/1989	100		

Correct slope data as needed .  

Data Management - Missing Data

☐ Missing SoilLS Plots
☒ Missing slope Length ==> **Correct**
☒ Missing slope ==> **Correct**
☒ Missing pub K (SoilMast) ==> **Correct**
☒ Missing T (SoilMast) ==> **Correct**
☐ Missing soil series (SoilMast) ==> **Correct**
☒ Missing soil series (PlotMast) ==> **Correct**

Select the Check Database button to check for the error categories listed to the left. All errors found will be written below and the category list will contain a check mark.

To print the errors select the printer button below.

Check Database  

Plot: 11 Date: 6/23/1989 Loc: 50 is missing Slope Length in SoilLS
Plot: 11 Date: 6/23/1989 Loc: 100 is missing Slope Length in SoilLS
Plot: 11 Date: 6/23/1989 Loc: 50 is missing Slope in SoilLS
Plot: 11 Date: 6/23/1989 Loc: 100 is missing Slope in SoilLS
Plot: 100 is missing soil series in PlotMast
Soil Series: MU is missing a published K value in SoilMast
Soil Series: temp is missing a published K value in SoilMast

Access LCTA Data Management

- Find null data and other errors

Data Management - Null Data

☐ Null LandUse values (LandUse) ==>	Correct	Select the Check Database button to check for the error categories listed to the left. All errors found will be written below and the category list will contain a check mark. To print the errors select the printer button below.
☐ Null Maintain values (MaintAct) ==>	Correct	
☐ Null Status values (ErosEvid) ==>	Correct	
☒ Null disturbance (GroundCover) ==>	Correct	
☐ Null VegID (GndCover) ==>	Correct	Check Database
☒ Null disturbance (LineMon) ==>		
☒ Null GndCov (LineMon) ==>		
☒ Null AerCov (LineMon) ==>	Correct	
☒ Null VegID (AerCover) ==>	Correct	
☐ Null VegID (BeltTran) ==>	Correct	
☐ Null VegID (BeltMon) ==>	Correct	

Plot 9, Date: 6/4/1991 has null disturbance data in GndCover.
Plot 1, Date: 7/3/1990 has null disturbance data in LineMon.
Plot 11, Date: 6/27/1990 has null disturbance data in LineMon.
Plot 100, Date: 7/3/2002 has null disturbance data in LineMon.
Plot 1, Date: 7/3/1990 has null GndCov data in LineMon.

Data Management - Misc.

☒ Duplicate values (LandUse) ==>	Correct	Select the Check Database button to check for the error categories listed to the left. All errors found will be written below and the category list will contain a check mark. To print the errors select the printer button below.
☐ Duplicate values (Maintact) ==>	Correct	
☐ Duplicate values (ErosEvid) ==>	Correct	
☒ Unknown/missing Info Vegid (AerCover) ==>	Correct	
☒ Unknown VegID BeltTran ==>		
☒ Unknown VegID BeltMon ==>		
☐ R Value errors ==>	Correct	

Check Database  

Plot 8, Date: 7/11/1990 contains 2 entries for No Mil.
Plot 6, Date: 6/5/1991 VegID: UNK may be unknown.
Plot 7, Date: 6/29/1989 VegID: T may be unknown.
Plot 9, Date: 6/4/1991 VegID: UNK may be unknown.
Plot 11, Date: 6/23/1989 VegID: T may be unknown.
Plot 1, Date: 7/3/1990 VegID: TEST may be unknown.
Plot 1, Date: 7/3/1990 VegID: TEST2 may be unknown.

Access LCTA Data Management

- Export database

Export Database

Available Tables:

- admin_Registry
- AERCOVER
- BASALA
- BELTMON

☐ All data tables

☒ Save column names

☐ Structure only

Target Database

- ☐ SQLBase
- ☐ SQL Server
- ☐ Informix SE
- ☐ Informix (BLOB support)
- ☐ Oracle
- ☒ None

Path: d:\viam\AccessLCTA\export **Select New Path**

Export to:

- DBase file
- Spreadsheet
- Text file

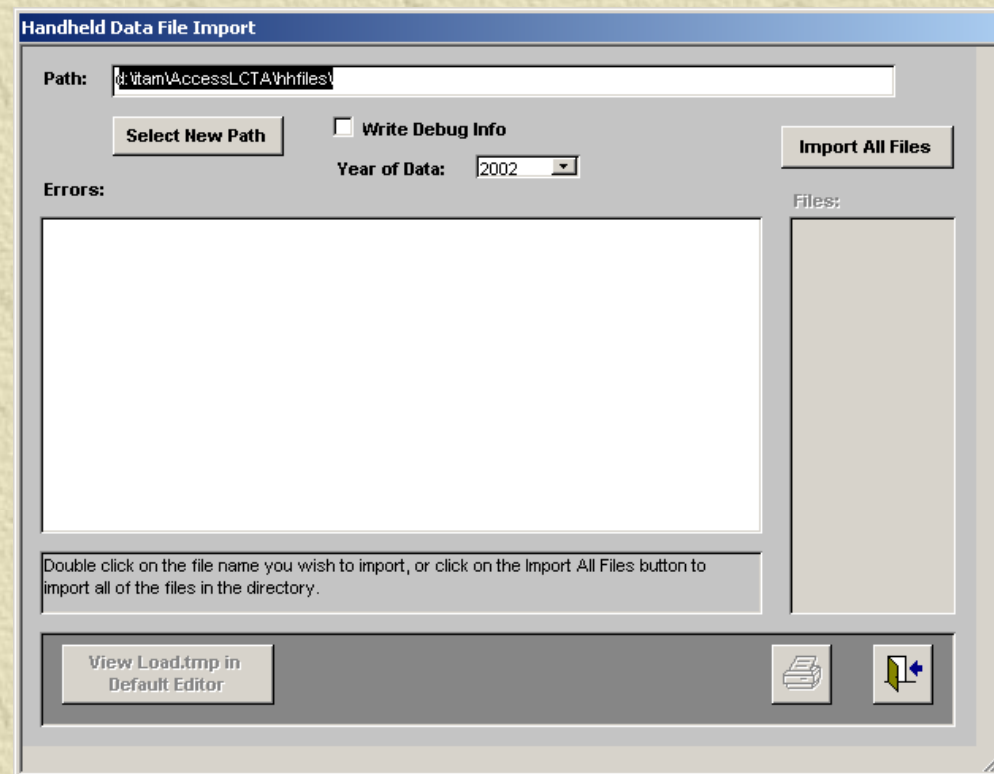
Output file will have the extension of

Export

Use this form to export single or all data tables. Options to include column names in the output and export only the structure are available. All files will be exported to the path listed above. ExportDBLog contains information about the table. All structure files will have the extension *.DDL. Check the target database documentation for the correct syntax of data definition files (DDL). This may defer from what is provided here.

Access LCTA Data Management

- Load handheld data
 - ♦ data collected using original protocol data logger program

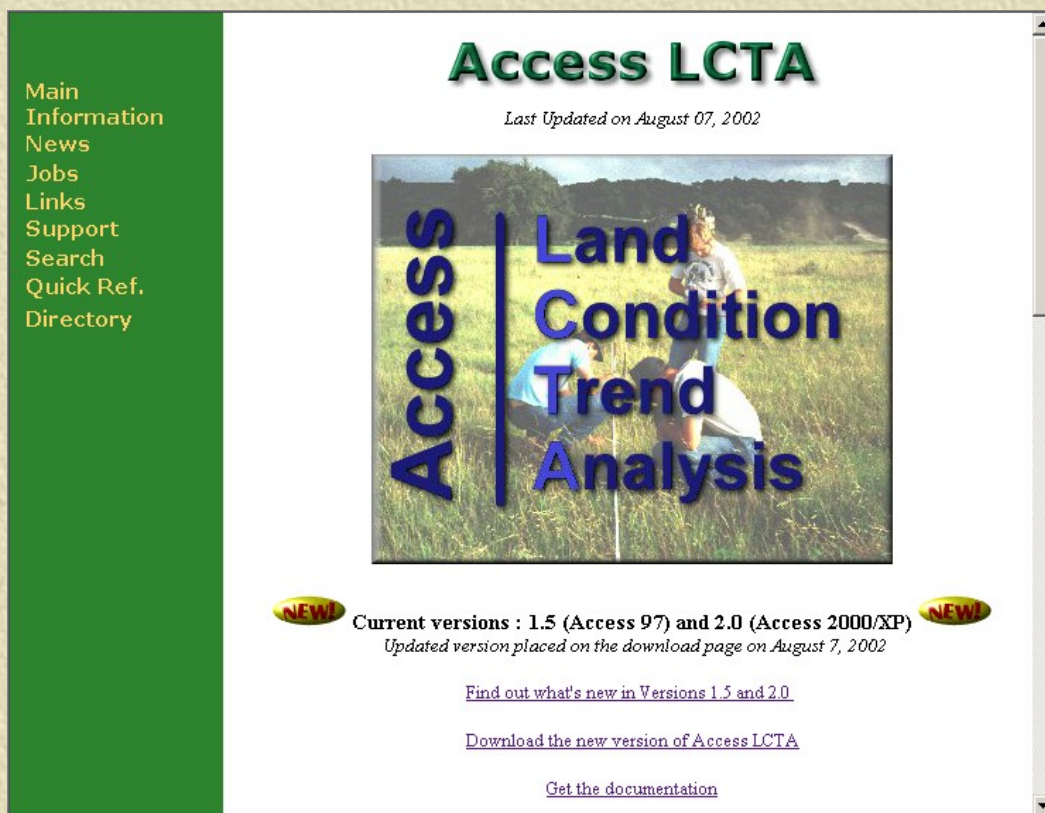


Access LCTA Requirements

- Windows 95 +
- Access LCTA version 1.5
 - ◆ Microsoft Access 97
- Access LCTA version 2.0
 - ◆ Microsoft Access 2000
 - ◆ Microsoft Access 2002 (XP)
- LCTA database based on original protocol schema

Access LCTA Web Page

- www.cemml.colostate.edu/accesslcta/accesslcta.htm



Big Button Program?



LCTA

NO!



